

## Some Changes in the Weed Flora of Whatcom County, Washington

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When the timber is removed from a forested region and the land is cleared for agricultural purposes, usually only a few weeds are present to contend with during the first few years. The native woodland species that are accustomed to the reduced sunlight, moist humus cover, higher atmospheric humidity, and other factors and conditions associated with a woodland environment, usually are unable to persist very long after the land has been cleared. Soon however, exotic weeds arrive, establish themselves and frequently multiply and spread rapidly. The interval between the time when most of the native species disappear from the arable land and the time when the foreign ones arrive, while somewhat variable with local conditions, as a rule is very brief.

After a number of years many of these introduced species may become very troublesome. Indeed, they may even form the most conspicuous part of the vegetation of waste land and roadsides. The less common species often go unnoticed until they are more widespread, when it is usually difficult to obtain much information concerning their first appearance.

At various times the writer has had opportunities for making observations and records of the flora of Whatcom County, Washington, the most northwestern county in the United States. Some of the more important changes observed in the weed flora of this county are recorded here.<sup>1</sup>

The eastern portion of Whatcom County lies in the Cascade mountains and, for the greater part, is still covered with virgin evergreen forests. This discussion refers only to the western portion of the county, extending from sea level on Puget Sound eastward for about 30 miles to the foothills of the Cascade mountains. The annual rainfall in this region averages about 40 inches, very little of which falls between July and September. The soils consist mostly of sandy and silty loams. Clay soils

<sup>1</sup> Based largely upon observations and records made by the writer as follows: 1900-1911; June-Sept. 1912; Sept. 1913; June-Sept. 1914; Aug.-Sept. 1915; Aug.-Sept. 1916; May-June 1918; Jan.-Sept. 1919; June 1929. Specimens of most of the species reported have been deposited in the herbarium of Cornell University.

are relatively infrequent but extensive areas of peat soil are common. The general features of the climate and soil<sup>2</sup> and of the flora<sup>3</sup> of this region have already been described. This area lies in the humid transition zone and consists mostly of very gently rolling uplands that were originally covered with a dense forest in which the Douglas fir, *Pseudotsuga taxifolia* Britt. was the dominant tree. The broad alluvial valley of the Nooksack river, and to some extent the valleys of smaller streams, as well as several extensive peatbogs, were originally covered with forests in which the western red cedar, *Thuja plicata* D. Don., and the Sitka spruce, *Picea sitchensis* Carr. were the dominant trees. Practically all of the forests have now been removed, the greatest activity having taken place during the last thirty years. Most of the lowlands, and such peat bogs as could be drained, have been cleared for farming land. Much of the upland has also been cleared and the remainder is mostly "logged off" or stump land used for pasture. The county has two seaports, Bellingham and Blaine, and the several towns within its boundaries are served by three railroad lines. Opportunities for bringing seeds of weeds into this county have been favorable since every year large quantities of feed and seeds are shipped in.

#### NATIVE WEEDS

After the removal of the forests only a few of the native species persisted as troublesome weeds in the clearings. Even some of these are species accustomed to the open places along the banks of streams or shores of lakes where trees were absent on account of the periodic fluctuations of the water level and erosion. The common brake fern, *Pteridium aquilinum* var. *pubescens* Underw. was the most troublesome pest on newly cleared uplands. Under thorough cultivation, or with persistent efforts to eradicate it, the brake fern usually survived only a few years but in some pastures and grasslands, it has survived for twenty years or more. In some neglected logged off pasture lands it has even spread. In the lowlands, especially in sandy soil, the common field horsetail, *Equisetum arvense* L., became

<sup>2</sup> Mangum, A. W. Reconnaissance soil survey of the eastern part of the Puget Sound Basin, Washington U. S. Dept. of Agric., Bureau of Soils Bull. 1911.

<sup>3</sup> Muenscher, W. C. Flora of Whatcom County, Washington. Muhlenbergii 9: 101-132. 1914.

very abundant, especially in meadows where it is even now a bad pest in many places. *Equisetum Telmataei* Ehrh. was frequently troublesome, especially in poorly drained pastures. On recently burned over stump lands and newly cleared land, the fireweed, *Epilobium angustifolium* L., frequently persisted for several years on the uplands, while on the lowlands, *Epilobium adenocaulon* Haussk., was a common pest in pastures, meadows and grainfields. Neither of these weeds persisted long under cultivation.

#### NATURALIZED AND ADVENTIVE WEEDS

1. Species well established and rather generally distributed before 1905.

In meadows: *Ginnania lanata* (L.) Hub., locally known as mesquite grass, especially common on peat land; *Achillea Millefolium* L., *Plantago lanceolata* L., *Rumex acetosella* L., on uplands. In pastures: *Cirsium lanceolatum* (L.) Hill, *Cirsium arvense* (L.) Scop., *Verbascum Thapsus* L., *Taraxacum officinale* L., *Bromus hordeaceus* L., *Aira caryophylla* L. In grainfields: *Brassica arvensis* (L.) Ktze., *Brassica juncea* (L.) Cosson, *Brassica campestris* L., *Raphanus sativus* L., *Spergula arvensis* L., *Avena fatua* var. *glabrata* Peterm. and, especially in peat land, *Polygonum hydropiper* L. On cultivated soils and in gardens: *Chenopodium album* L., *Amaranthus retroflexus* L., *Stellaria media* (L.) Cyrill, *Capsella Bursa-pastoris* (L.) Medic. *Sonchus asper* L., *Sonchus oleraceus* L., *Polygonum Persicaria* L. and *Polygonum Convolvulus* L. About barnyards and in waste places: *Polygonum aviculare* L., *Plantago major* L., *Anthemis Cotula* L., *Sisymbrium officinale* (L.) Scop., *Rumex crispus* L., *Echinochloa crus-galli* (L.) Beauv. Although native on the Pacific coast, *Matricaria suaveolens* (Pursh) Buch. and *Erigeron canadensis* L. appear as if introduced in Whatcom County.

2. Species occurring before 1905 but apparently not spread to any extent since.

Mostly in waste places or about farm buildings: *Arctium minus* (Hill) Bernh., *Centaurea Cyanus* L., *Cytisus scoparius* (L.) Link., *Panicum capillare* L., *Veronica arvensis* L., *Marrubium vulgare* L., *Nepeta hederacea* (L.) Trev. and *Lychnis Coronaria* (L.) Desv.

3. Species observed first between 1905–1910, but which since then have spread and were rather common weeds in 1929.

Chiefly in upland meadows: *Chrysanthemum Leucanthemum* var. *pinnatifidum* Lecoq. and Lamotte. In pastures and meadows on clay or peat soil: *Ranunculus repens* L. Mostly in dry upland pastures: *Trifolium procumbens* L., *Trifolium dubium* Sibth., *Geranium molle* L. and *Bromus tectorum* L. In waste places and cultivated ground: *Lactuca scariola* L., *Oenothera biennis* L., *Sisymbrium altissimum* L., *Brassica nigra* (L.) Koch, and *Geranium pusillum* Burm. f.

4. Species observed first between 1905–1910 but still appearing only very locally.

*Setaria viridis* (L.) Beauv., *Hypericum perforatum* L., *Silene noctiflora* L., *Solanum dulcamara* L., *Digitalis purpurea* L., *Rumex obtusifolius* L., *Sisymbrium Sophia* L., *Medicago Lupulina* L., *Erodium cicutarium* (L.) L'Her., *Nepeta cataria* L., *Malva rotundifolia* L.

5. Weeds observed first between 1910–1919.

*Hypochaeris radicata* L., *Crepis capillaris* (L.) Wallr. and *Linaria vulgaris* L. locally common in grasslands, pastures and waste places in 1929. *Cichorium Intybus* L., *Daucus Carota* L., *Hordeum jubatum* L. and *Pastinaca sativa* L. local in waste ground and along roadsides in 1929. *Agrostemma Githago* L., *Saponaria Vaccaria* L. and *Bromus secalinus* L., observed in a wheat field and about poultry yards in 1919, but have shown no tendency to spread.

6. Species apparently recorded for the first time since 1920.

\**Ranunculus acris* L., first noticed in 1922, was widespread and very abundant in wet meadows, pastures and along roadsides in 1929. *Barbarea vulgaris* R. Br., *Silene latifolia* (Mill.) Britt., *Lychnis alba* Mill., *Dianthus armeria* L., \**Erysimum cheiranthoides* L. and *Malva moschata* L. were found locally in new meadows and along roadsides in 1929. *Agropyron repens* (L.) Beauv., *Chenopodium urbicum* L., \**Conringia orientalis* (L.) Dumont. and \**Fumaria officinalis* L. occurred in cultivated soil near farm buildings. \**Conium maculatum* L., \**Symphytum asperum* Lep., *Sonchus arvensis* L., \**Centaurea Jacea* L., *Melilotus alba* Desr. and \**Melilotus officinalis* (L.) Lam. were observed in waste ground and along roadsides. The species pre-

ceded by an asterisk are not included in the flora by Piper and Beattie<sup>4</sup> covering this part of Washington.

Of the 96 weeds reported from Whatcom County, Washington, five are native species. The rest are naturalized or adventive, mostly from Europe. Among the 46 widespread, or at least locally common, naturalized weeds, 33 were already so by 1905, eight more species became so by 1910; three more by 1919, and two more by 1929. Among the 42 uncommon or very local weeds, eight species were known to occur in the county before 1905; 12 more by 1910; seven more by 1919; and 15 more by 1929. Among the earlier weeds brought into Whatcom County the most noxious are the Canada thistle, *Cirsium arvensis* (L.) Scop. and the mesquite or velvet grass, *Ginnania lanata* (L.) Hub., and several mustards, *Brassica* spp. Among the most noxious of the recently introduced weeds are the tall field buttercup, *Ranunculus acris* L., and the winter cress, *Barbarea vulgaris* R. Br. Both of these species are already widespread and in the future will, in all probability, become very common on the heavier soils and lowlands. The quack grass, *Agropyron repens* (L.) Beauv. and the perennial sow thistle, *Sonchus arvensis* L., the worst weeds in the northeastern and north central States, respectively, have become well established in Whatcom County. It remains for the future to reveal to what extent these pests will trouble the farmers of Whatcom County.

CORNELL UNIVERSITY

### Stations for the Southern White Cedar

In a talk before the club on May 6th Mr. Torrey spoke of several unusual stands of the Southern White Cedar. Mr. Russell B. Evans reports another location, a swamp west and north west of Franklin Lake, N.J. The swamp occupies a glacial kettle hole. Most of the trees in the swamp are dead, dozens of them are up to a foot in diameter. Some living trees are near the outlet and some dead ones have been dragged out, barked and cut up, as the waste on the knolls west and south of the swamp indicates.

A census of the stands of *Chamaecyparis thyoides* remote

<sup>4</sup> Piper, C. V. and R. K. Beattie. Flora of the Northwest Coast. 1915.